

A Cooperative Project between the U.S. Environmental Protection Agency and the Garment and Textile Care Industry



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Garment and Textile Care Program



Case Study: 100% Wetcleaning Facility: Route-only Service

As part of a cooperative effort between the Environmental Protection Agency (EPA) and the professional garment and textile industry, the EPA Design for the Environment (DfE) Program recognizes the wetcleaning process (i.e., a water-based cleaning system) as one example of an environmentally-preferable technology that can effectively clean garments.

Currently, most of the nation's 34,000 commercial drycleaners use perchloroethylene (perc) as a solvent to clean clothes. Since 1992, in response to growing health and environmental concerns about perc, EPA has been working in a voluntary partnership with the drycleaning industry to reduce exposures to perc. EPA's DfE Garment and Textile Care Program (GTCP) encourages professional clothes cleaners to explore environmentally-preferable technologies capable of cleaning garments labeled "dryclean only." Numerous

companies in the garment and textile care industry have begun using the wetcleaning process to clean all types of fabrics. One company, The Laundry Club, is a 100 percent wetcleaning facility, utilizing wetcleaning as the only garment care process.

Company Background

The Laundry Club (TLC) began cleaning garments in August of 1998 in the Washington D.C. suburb of Leesburg, VA. The company, a family owned and operated business, began as a route-only service to meet its customers' everyday laundry needs. As the business began to grow and the customer base increased, TLC recognized the need to expand their professional cleaning methods to accommodate those garments that are traditionally drycleaned. The company's goal was to provide high quality professional garment care to customers without the health and environmental concerns associated with traditional drycleaning solvents.

With this criterion in mind, and no prior experience in the garment care industry, TLC explored various professional cleaning options using the internet, making phone calls to industry equipment and supply manufacturers, visiting industry trade shows, and attending educational seminars through the International Fabricare Institute. Through this research, TLC was impressed with the benefits of modern wetcleaning relative to traditional drycleaning. Benefits include the elimination of health and environmental concerns, the high quality results achievable by professionally wetcleaning garments as well as the lower cost of wetcleaning units relative to drycleaning units. Also, advances in textile manufacturing have created fabrics that respond well to the wet-cleaning process.

This notice has been reviewed by the Environmental Protection Agency (EPA) and approved for publication. It is based on experiences gained from projects conducted by EPA's Design for the Environment staff in collaboration with partners from industry, public interest groups, and research/educational institutions. The information contained in this document does not constitute EPA policy. Further, mention of trade names or commercial products does not imply endorsement or recommendation for use. All product performance information was supplied by the manufacturer(s) and has not been independently corroborated by EPA.

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The initial training to become a professional wetcleaner was extensive because it required gaining a knowledge of the fibers and fabrics in addition to the process itself. TLC asserts that after appropriate and thorough training, the TLC staff are able to wetclean virtually all types of fabrics, including woolens, silks, rayons, acetates, linens, cottons, suede, and leather with excellent results. In addition to those materials, and as a result of their research, development, and testing, TLC is now successfully wetcleaning rayon/acetate velvets and rayon/silk velvets (fabrics that traditionally were not recommended for wetcleaning).

What is Wetcleaning?

Wetcleaning is a professional garment cleaning technique that uses a combination of specialized detergents and additives and controlled water temperatures and agitation levels. For large scaled production, the process requires four elements: computer-controlled washers and dryers, specialized detergents and additives, tensioning finishing equipment, and trained, skilled personnel. Unlike conventional washing machines, state-of-the-art commercial wetcleaning units are computerized machines that can be programmed for various functions, including agitation, water temperature, water volume, and the addition of specialized detergents. For garment pressing to be most effective, proper drying and finishing equipment, which includes standard equipment utilized by most professional cleaners, is a necessity.

Cleaning Agents at The Laundry Club

Wetcleaning does not pose the environmental and health concerns associated with traditional drycleaning. Not only does it use water as its primary solvent, but all cleaning agents used at TLC are environmentally-preferable products. Typically, wetcleaners use three separate cleaning agent products. These include specialized detergents, conditioners, and sizing. TLC uses SmartCare, an all-in-one product made by Kleerwite® CHEMICAL in conjunction with its cleaning process. TLC has found that the SMART Care™ all-in-one product is successful in reducing water usage due to shorter rinse cycles. Also, this product has virtually eliminated the need for post-spotting.

One issue that wetcleaners face is the difficulty of removing grease and oil-based stains. TLC injects Nature-L™, a degreaser made by Kleerwite® CHEMICAL, in conjunction with SMART Care™ during the wetcleaning process to enhance grease and stain removal. The amount of each product injected is adjusted by manual controls on the wetcleaning unit as appropriate for each fabric type, the soil level, and the weight of the cleaning load.



The Laundry Club van.

Wetcleaning Machinery

TLC uses a 60-pound Unimac wetcleaning machine with a microprocessor and customized computer programs. The machine is fitted with a re-circulation pump and injection system for cleaning agents. There are also smaller wetcleaning machines available for low volume loads.

Drying and Finishing

Depending on fabric type, TLC may place garments in a 75-lb UniMac or a 50-lb Heubsch dryer for a brief period of time. The drying time is determined by the fabric content. The garments are then air-dried to complete the drying process. TLC's pressing and finishing equipment includes two standard professional cleaning finishing machines: a Forenta utility press and a Forenta pants press. In addition, TLC employs two specialized finishing machines: a Hi-Steam Tensioning Pants Topper, and a Hi-Steam Tensioning Form Finisher, which were developed primarily for wetcleaning. Employees at TLC with previous experience in the drycleaning industry find the overall finishing process for wetcleaned garments to take no longer than for drycleaned garments. The most significant difference is associated with structured garments, which may require an estimated 5-10 percent increase in finishing time as compared to traditional drycleaning.

Operation:

The Unimac washer and dryer, and all finishing equipment used at TLC require minimal maintenance. They are maintained according to manufacturers' directions.

Performance

No independent performance testing has been conducted or is being planned. The performance information that is presented in this case study was provided by representatives of The Laundry Club.

TLC has the ability to clean 100 percent of garments that are normally drycleaned, using automated, state-of-the-art wet-cleaning techniques and skilled personnel. TLC can wetclean virtually all garment types ranging from casual wear to business suits and formal wear and fabric types including woolens, silks, rayons, acetates, linens, cottons, suede, and leather – all with excellent results.

Garments cleaned by traditional drycleaning methods are not subjected to the same conditions as those garments that are immersed and agitated in water. Although, modern wetcleaning machines have eliminated most of the problems that can stem from immersion in water, certain fabrics can shrink, certain dyes can bleed, and fabric texture can be altered just as they can in traditional solvents; neither method is perfect. The primary difference between the two technologies is that drycleaning relies on solvents such as perc and specialized detergents to clean clothes, while wetcleaning uses water and environmentally-preferable detergents, thus presenting less risk to human health and the environment.

- **Problem stains.** TLC asserts that the wetcleaning process is superior at removing water-based stains such as those caused by food.
- **Problem fabrics.** TLC is now successfully cleaning fabrics that traditionally were not recommended for wetcleaning such as rayon/acetate velvets and rayon/silk velvets. The only fabric that TLC does not attempt to wetclean is antique satin, which is different from regular satin, and is rarely encountered anymore.
- **Garment damage.** TLC asserts that there are no cases of garment damage at The Laundry Club.
- **Shrinkage/Wrinkling.** The TLC process and perc processes rarely result in shrinkage or wrinkling. TLC asserts that the all-in-one detergent helps to limit shrinkage to less than one percent of all garments cleaned.
- **Prespotting.** Both the TLC process and perc processes require about the same amount of prespotting.
- **Color retention:** Machine wetcleaning is a superior process with respect to resistance to discoloration, color loss, dye bleeding, and ability to process multicolor garments.
- **Hand and feel:** TLC asserts that one of the main benefits of wetcleaning is the softness and feel that the garment has after being wetcleaned.

- **Solvent Odor:** The TLC process leaves no residual odor, unlike traditional processes.
- **Cycle Time-Washing.** The TLC process requires a 15 to 20 minute wash cycle.
- **Cycle Time-Drying:** The drying time is determined by the fabric content. Depending on fabric type, TLC may place the garments in a dryer for a brief period of time. The garments are then air-dried to complete the drying process.
- **Pilling.** As a result of air drying, the TLC process substantially reduces pilling.
- **Labor and Finishing:** TLC indicates that employees with previous experience in the drycleaning industry find the overall finishing process for wetcleaned garments to take no longer than for drycleaned garments.
- **Adhesives.** TLC asserts that for all garments containing adhesives, the adhesives are thoroughly tested to ensure that they are water insoluble before being wetcleaned.

Environmental, Safety & Health Impacts

The environmental, human health, and safety impacts resulting from the wetcleaning process are less than the impacts associated with the use of traditional solvents. Wetcleaning wastewater, if left untreated and discharged directly into a lake or stream, could pose risks to aquatic life. However, it is normally the case that such wastewater is discharged into a public sewer system and treated at the local publicly owned wastewater treatment facility in accordance with Federal Clean Water Act requirements. Under these normal conditions, risks to aquatic life are minimized. Potential human health and safety impacts are essentially limited to minor skin and eye irritation. Skin and eye exposure to the cleaning agents can be minimized through adherence to proper operational procedures.

The wetcleaning process does not produce hazardous wastes, hazardous air emissions, greenhouse gases, or ozone depleting substances. The spotting and cleaning agents are nonsolvent formulations that are biodegradable and generally benign. Water consumption at TLC using one (all-in-one) cleaning agent in conjunction with the wetcleaning process (approximately 100 gallons per 30-lb load) is less than that associated with a three-product wetcleaning process. Also, compliance with federal and state hazardous waste regulations is eliminated and the regulatory burden associated with wetcleaning is much less than the regulatory burden associated with traditional drycleaning solvents.

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Capital and Operational Costs

The cost for modern wetcleaning machines range from approximately \$12,000 to \$37,000 for a washer and dryer set (30 to 50 pound capacity). In comparison, the costs for a perc machine of comparable capacity range from approximately \$32,000 to \$47,000 and the costs for a comparable petroleum machine range from \$35,000 to over \$100,000. Specialized finishing (tensioning) equipment is as an essential component of the wetcleaning process. There are two basic types of wetcleaning finishing equipment, form finishers and pants topers. The cost of each of the two equipment types range from approximately \$6,000 to \$12,000. This price range is comparable to that of traditional drycleaning pressing equipment. An investment in specialized wetcleaning finishing equipment will reduce labor costs associated with the finishing process and pay for itself over time.

The Unimac washer and dryer, and two pieces of Hi-Steam finishing equipment at TLC cost just under \$35,000 total. However, there are a number of companies that sell wetcleaning and tensioning finishing equipment and for the most accurate and up-to-date wetcleaning equipment costs and information contact the individual wetcleaning equipment supply companies.

Operational costs at TLC for the calendar year 2000 account for the following proportions of total sales: approximately 14% in supplies (detergents and additives), 26% in labor costs, 20% in equipment leases and maintenance, and 9% in electrical and natural gas costs. There are no solvent supply and disposal costs associated with the wetcleaning system used at TLC.

Impact on Business

According to TLC, the wetcleaning process enables their company to provide quality professional garment care services to customers at competitive prices without the environmental, health, and safety impacts associated with traditional drycleaning solvents. Relative to traditional drycleaning, the environmental regulatory burden associated with wetcleaning is significantly reduced. The need to comply with the numerous federal and state regulations that apply to perc and petroleum solvents, as well as federal and state water quality regulations, is eliminated.

What is DfE?

EPA's Design for the Environment (DfE) Program is a voluntary initiative that forges cooperative partnerships among government, industry, academia, and environmental groups.

One of the primary objectives is to incorporate environmental concerns into the design and redesign of products, process, and technical management systems.

The goal of the Garment and Textile Care Program is to provide cleaners with the information that can help them run their facilities in a way that is more environmentally sound, safe for workers, and more cost effective. To accomplish this goal, the program utilizes EPA expertise and leadership to evaluate the environmental and human health risks, performance, and cost tradeoffs among clothes cleaning technologies. DfE disseminates information to all interested parties and assist businesses in implementing environmentally-preferable technologies.

For More Information

- For more information about The Laundry Club, the wetcleaning process, and training, contact:
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- Contact the EPA Pollution Prevention Information Clearinghouse (PPIC) to receive an information packet about EPA's DfE Program or the Garment and Textile Care Program, or to request single copies or a list of DfE documents.
EPA's Pollution Prevention Information Clearinghouse (PPIC)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW (7409)
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- Visit the EPA DfE Garment and Textile Care Program website:
<http://www.epa.gov/dfe/garment/garment.html>
- Visit the DfE Program website: <http://www.epa.gov/dfe>



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